SOCIETY OF ARTS.

FRIDAY, APRIL 15th, 1853.

SIXTEENTH ORDINARY MEETING,

Wednesday, April 13th, 1853.

THE Sixteenth Ordinary Meeting of the Society was held on Wednesday, the 13th instant, the Right Honorable Lord Wharncliffe in the chair.

The following were elected Members:

Collins, Edward, 314, Oxford-street.
Curtis, William, Alton, Hants.
Davis, Elias, 54, Tavistock-square, and Aldgate-high-street.
Merrifield, Mrs. Mary P., 8, Dorset-gardens, Brighton.
Ord, Augustus W., Abingdon-street, Westminster.
Pinkney, Robert, 26, Long-acre.
Ruff, Edward, 9, Prince's-place, Kennington-road.
Verinder, John H., 79, St. Paul's-churchyard.
Wilkinson, John, Leeds.

and the names of two candidates for membership were read.

The following Institutions have been taken into Union since the last meeting:

262. Bramley, Mechanics' Institute.
263. Limerick, Literary and Scientific Society.

A paper was read "On Explosions in Mines and Colleries, and the Means of preventing them," by Mr. Robert Blackwood, of Kilmarnock.

After a brief allusion to the importance of the subject, the Author gave a general description of underground workings, stating that when a shaft is sunk to the coal seam intended to be wrought, and when fairly through to the under side of the coal bed, and the direction of the dip of the seam, or inclination of the strata to the horizon properly ascertained, excavations in the face or breast of the coal are made from three to six yards wide, according to existing circumstances. These excavations or drifts are carried forward in a direction at right angles to the dip, forming what are called level headings, and serve the purpose of travelling or drawing roads, for bringing the coals from the working faces to he bottom of the shaft, and also for a course for carrying off the water from the future workings, and a passage for the air current for ventilation. At right angles to these headings other excavations from three to six yards wide are made to the rise of the coal seam, and from ten to thirty yards apart, according to the size of pillars intended to be left. These are again cross-cut into endings, forming pillars of from ten to thirty yards square, to support the roof and superimposed strata. These pillars are left standing till the mine has been wrought to its extreme boundary, when they are robbed or taken away entirely, the roof of the mine being allowed to come down, or follow of itself. This part of the workings, extending in some cases over an area of several acres, is called the waste, and in fiery mines becomes the reservoir for the carburetted hydrogen, or fire damp, which exudes from the coal. This system of working is what is termed the pillar and bord, or in Scotland the stoop and room system.

For the safe and efficient working of any mine, a proper system of ventilation is necessary, for the free respiration of the workmen, and also for the purpose of carrying off the noxious and dangerous gases that exude from the coal as the work proceeds. The development of carburetted hydrogen gas, or fire damp, the dread of the miner, and the cause of such fearful loss of life, is inseparable from mining operations, being produced from the decomposition of the vegetable matter of which the coal is composed, and lies dormant and pent up in the numerous cavities and fissures of the coal seam. In deep mines, and those in which the coal is of a rich quality, this gas is given off in great abundance from the numerous cavities or pores in the strata being intersected and laid open by the operations of the miners, and is constantly being drained off as fresh faces of coal are exposed. This gas sometimes exists in the seams under very considerable pressure, and rushes out into the workings with great force. When mixed with a certain proportion of common air, this gas becomes highly inflammable when brought in contact with flame, giving rise to fearful explosions, and consequent loss of life, when a miner carelessly, or through ignorance perhaps, exposes his naked lamp or candle to this treacherous atmosphere. Hence the necessity for a vigorous ventilation, and an ample supply of fresh air at all times to the workings, to dilute the atmosphere of the mine below the firing point, and thereby render it harmless and safe for the operations of the miners.

Except where the ventilation is natural (a system that cannot be sufficiently deprecated), the means almost universally adopted for clearing and keeping the mine free of this explosive atmosphere, is ventilation by rarefaction. In a mine where only one shaft is sunk to the coal, a partition, or brattice, generally of wood, is put in, dividing the shaft into two sections from top to bottom, the one termed the upcast, and the other the downcast shaft. At the bottom of the upcast shaft a powerful furnace or cube is kept burning, which has the effect of rarefying the air, and producing an ascending current in the upcast shaft; the cold, pure air going down the downcast, to fill up the partial vacuum caused by the rarefaction, communicates motion to the air throughout the mine, and thereby causes a current of fresh air to circulate and sweep along the face of the coal in process of being wrought, diluting and carrying off the carburetted hydrogen as it is produced, through the furnace, to the upcast shaft, and thence to the external atmosphere.

It will be at once apparent that a copious air current, and the keeping of it in its proper course, is of the first importance, as upon it depend the ventilation of the mine, and the lives of the men employed; as in almost every instance where accidents from explosions of fire-damp occur, the cause may be almost invariably attributed to an insufficiency of air, either from a defective furnace, contracted air courses, or the current being allowed to leak or waste, or otherwise improperly applied. In the process of excavating the coal, the current is kept up to air the face of the workings, by stoppings of brick and mortar being put in, from time to time, betwixt each row of pillars as the work proceeds; so that what was formerly a room or bord, now becomes a passage for the

in-take of fresh air as each pillar is formed, thus making a continuous air course from the bottom of the downcast shaft, round the face of the workings, and back again through the furnace to the upcast shaft.

Every one experienced in mining operations is aware of the tendency to leakage and waste in the air course. When it is remembered that some coal winnings extend over an area of several acres, and that the air course must of necessity be lengthened out, as the work advances, so that in such cases the ventilating current has to travel a distance of thirty or forty miles before returning to the upcast shaft; and when, too, it is remembered that throughout the whole extent of the air course, it is kept up to the faces by stoppings of brick and rubbish built in as the coal is excavated, it is not to be wondered at should the current be weak and sluggish in some parts, especially when we recollect that from the moment the current leaves the bottom of the downcast shaft, its constant tendency is to abandon the faces, and rush to the furnace, through any door or crevice it can find, leaving the parts in advance only partially ventilated.

Explosions of fire-damp frequently arise from want of attention to the doors in the drawing roads and air courses, which, except when a miner is passing with his load, should always remain closed. These doors are in some collieries kept by boys called trappers, and in others they are self-acting swing-doors. Colliery managers are divided in opinion, on which of these two systems most dependence can be placed. In either case, this department of the underground management requires the most vigilant oversight; neglect of this is ruinous to the entire ventilation: it matters not how superior and complete the other arrangements of the mine are, the most powerful furnace will be found inadequate for the ventilation of the workings in advance of any door left open, as the current will entirely abandon the face of the workings, and rush straight to the furnace by the shortest and most direct course it can find. The ventilating current is then diverted out of its course, fresh air is no longer carried forward to the workings in advance of this point, the atmosphere of the mine gets vitiated, and gradually becomes fiery and inflammable from the accumulation of fire-damp in the working faces, and the miners meanwhile, being unaware of any negligence, and trusting to the usual supposed safety of the mine, are insensibly surrounded by an inflammable atmosphere, and an explosion is inevitable. Double doors, whether self-acting or kept by trappers, should invariably be fitted in the air course and main drawing roads, especially where there is frequent passing. These doors are never both open at the same time, but are arranged so as to open and close alternately, the one shutting before the other opens, and thus acting as a guard upon each other. In well conducted mines, and especially in those of a fiery nature, where working with naked lights is considered precarious, the air course and drawing roads are guarded with a set of three doors, thus rendering accidents from leakage or waste of fresh air at this point almost impossible; were this the prevailing custom, loss of life from explosions of fire-damp would be of much rarer occurrence.

Explosions of fire-damp frequently occur from another cause, even with an abundant supply of pure air, and a powerful ventilating current in the air course. This is the case when a heading or drift has been driven so far in advance of the air course, that the end or face of it is out of reach of the current. In coal-seams, where fire-damp is given off in great abundance, it is found necessary in excavating a heading or drift, to carry up a little fresh air to ventilate it, whenever the end or face of it is considered beyond reach of the current. This is done by fitting in a brattice of loose boards in the heading, the boards being laid on their edges from the pavement to the roof, dividing the heading into two sections, a scale of air being taken up the one side of the brattice to air the face, and then returned down the other side into the air course as before. Special attention should be paid to this where the strata are much inclined to the horizon, as the carburetted hydrogen being specifically lighter than common air, naturally floats uppermost, and gradually rising to the highest point, ultimately accumulates in the end of the heading, and unless air be taken up to dilute it, has no tendency of itself to come down to the air course to be carried off. Explosions of a trifling nature, and attended with little loss of life, occur very frequently in these headings, and extend no farther than the air course, being there met and extinguished with fresh air; but should the air current, after travelling along a series of working faces, be so far vitiated as of itself to be also inflammable, an explosion, even of a comparatively trivial kind, is attended with the most disastrous results, as the fire in such a case is taken up by the current, and communicated to the atmosphere of the whole mine.

Loss of life from explosions of fire-damp may be divided into two classes; first, death caused directly by scorching, and the violence of the explosion; and secondly, death by suffocation from choke-damp. The result of some of these explosions is most disastrous; when ignited at any point the flame instantly spreads itself throughout the workings in the neighbourhood, and that portion of the mine becomes a mass of living fire. So intense is the heat produced that the timber is generally all destroyed, and sometimes the pillars of coal are found to be charred to the depth of several inches. The dross, rubbish, and small particles of coal produced from the workings become ignited, and the enormous expansion of the air from such a high temperature drives every thing before it, doors, brattices, props, loose masses of coal, together with any unfortunate miners that may be within its influence, are carried out with irresistible force through the air course or drawing roads towards the shaft, the only outlet where the explosion can expend itself. The carbonic-acid gas or choke-damp, which is produced in great volume from the previous combustion, is drawn back again into the mine to fill up the vacuum caused by the expansion, and envelopes the miners, so that those who escape the violence of a scorching fire perish from suffocation; as in almost every case when only one shaft is sunk the brattice is destroyed, and any attempt to restore the ventilation in time to save the men is rendered hopeless. This is, perhaps, one of the

strongest arguments in favour of double shafts, now so common in the North of England. The wooden brattice in a single shaft being constantly getting out of order, from moisture and its proximity to the furnace, never, even when in the best condition, perfectly isolates the one shaft from the other; neither can it ever be so air-tight as when two distinct shafts are used, where the mass of earth betwixt them becomes a natural brattice, and also when an explosion does occur is of sufficient strength to withstand the shock, so that the ventilation can be restored in a comparatively short time, and the means of raising the miners to the surface still remain available.

From what has been advanced it will be plain that, under the present system of ventilation by rarefaction, the safety of a mine depends on a powerful furnace, a capacious air-course, the headings well bratticed, and an ample ventilating current.

It is to be regretted that, at the present day, when loss of life from explosions of fire-damp is so very frequent, so much dependence should still be placed on natural ventilation. This system is at once feeble, variable, and uncertain in its action. Instead of being urged on by a vigorous furnace, the ventilating current is caused by, and merely dependent on, the excess of temperature that may chance to be in the one shaft above that in the other, so that the current throughout the mine cannot be otherwise than weak, sluggish, and totally insufficient for the purpose intended. It is well known that the ventilation of any mine, even on the most approved system, is frequently materially affected by any change in the temperature of the external atmosphere. In summer, ventilation, even under the most favourable circumstances, is never so perfect as it is in winter, from the fact that the temperature of the atmosphere approaches nearer to that of the mine in summer than it does in winter. The natural ventilating current in a mine unassisted by a furnace, is so feeble as to be most materially affected by any such change of temperature, causing the air in the mine that should otherwise be circulating briskly, to be stagnant and utterly dead. So imperfect is the ventilation in such cases, that upon any sudden change of wind or temperature, the current is sometimes completely reversed, so that what was formerly the upcast-shaft, now becomes the downcast, and the return or vitiated air is drawn back again into the workings, as intake or fresh air. This being a circumstance over which no one has control, the ventilation of the mine is for the time destroyed, and any trifling current that may be generated is wholly dependent on the air in any of the shafts assuming a higher temperature than that in the other. Under a system of ventilation so very imperfect, it is not to be wondered at that accidents from explosions, and those of the most appalling kind, should occur. Until this system is entirely abolished, loss of life must continue, and the proprietors and managers of such collieries be, in a great measure, culpable.

A contracted or otherwise insufficient air-course is also the cause of much defective ventilation. In all mines, the air-course should be distinct and apart by itself, well kept, and of sufficient area to admit of the passing of a copious column of air for any emergency, as it too frequently happens that the current is no more than adequate for the ordinary ventilation of the mine; so that when any sudden discharge of gas is given off, explosions take place, the pure air not being in sufficient volume to dilute and carry off the gas. In collieries where drawing-roads are made to serve the purpose of the air-course, the current is much impeded by the transit of the produce of the mine towards the bottom of the shaft, and also by the miners carelessly leaving their empty hutches in the drawing-roads or air-course.

A very decided improvement in the system of ventilation is now being pretty generally adopted in the northern districts of England. This consists in working the mine in isolated districts, and splitting the in-take air into several distinct columns at the bottom of the downcast shaft, and appropriating one separate column to each district. By this means the faces are aired more perfectly, each current has a much shorter course to travel, the tendency to leakage is less, and the return air is not so much charged with fire-damp; admitting of a freer use of naked lights than when the air is brought round the faces in one undivided column, and also, when an explosion does occur, it is generally confined to the district in which the gas has been ignited.

It is to be feared, however, that even under the most approved system of ventilation at present adopted, accidents from explosions of fire-damp in mines and collieries can never be entirely averted: this must exceed the hopes of the most sanguine. Circumstances unforeseen, and over which no one can have control, will at times defeat the most vigilant and judicious management; but much may, and still requires to be done, to prevent these most disastrous accidents It is at the same time both difficult and dangerous to lay down any fixed law or system to be adhered to in ventilating collieries generally. This must be left to the judgment of an intelligent and experienced manager, thoroughly conversant with the principles of ventilation; as a system that would work satisfactorily in one mine or colliery might be wholly impracticable in another. The method of splitting the air and working in districts, however, is certainly a great step in advance, and is at present the most perfect system of ventilation known. If carried out judiciously, and with a rigorous discipline, ordinary caution on the part of the miners will be a sufficient safeguard against explosions, and will, if it do not wholly avert, at least greatly tend to lessen, the number of such direful calamities.

Mr. Varley observed that one of the Society's volumes contained the details of a plan of colliery ventilation, for which they had awarded one hundred guineas, and a gold medal to Mr. Ryan. He suggested that the model illustrating this plan should be exhibited in conjunction with Mr. Blackwood's model, and recommended that a prize should be offered with a view to the testing of Mr. Ryan's plan, and obtaining practical results. He then proceeded to describe the plan to which he referred, the chief peculiarity of which was the use of pipes from the upper portion of the seam for the purpose of carrying off the light carburetted hydrogen gas.

Mr. Blackwell remarked that this plan was only applicable to collieries where the seams were much thicker than those common in this country. There was one point in regard to colliery accidents that was generally overlooked; they were often attributed to secondary instead of primary causes. It was common to trace each particular accident to some special carelessness of the workmen engaged at the time; whereas, in point of fact, this was only the exciting or secondary cause; the real and primary cause being the bad condition of the mine, which admitted of a casual act of carelessness leading to an explosion. The leaving open of a door, the taking off the top of a lamp, or some equally trivial act, was generally regarded as the cause of an explosion. It was, however, nothing of the sort. These things were sure to occur continually; and it was therefore to the general condition of the mine that consideration should be mainly directed, as it was only when the general ventilation was defective that these every-day occurrences could issue in accidents. There were two modes in which explosions in mines could be prevented: the first was by complete ventilation; the second, by the use of the Davy Lamp; and he regretted to say that the latter had not been adopted in this country to any extent. Neither ventilation nor the use of the "Davy" were alone sufficient; both should be used in order to secure safety. He believed, from extensive knowledge of the subject, that not a single instance of explosion had occurred that had originated in the use of a Davy Lamp. Much might be done by improved ventilation; but under the very best arrangements of this kind, circumstances would occur, in an unforeseen manner, in which the air would be overcharged with explosive gas, and unless the "Davy" were also used, accidents would inevitably follow. This was the case in the explosion in the Bentham seam, at Jarrow; for although the ventilation was well managed, it so happened that the seam having only been a short time opened gas accumulated, and a naked light being used instead of a "Davy," an explosion occurred, by which 100 lives were lost. In May last he was sent by Government into South Wales to inquire into a colliery accident. On a previous occasion when he had visited the mine, he had told the proprietor that unless the Davy Lamp were adopted they would most certainly have another explosion; they did not adopt it, and nine months had not elapsed before another explosion occurred, by which sixty-five lives were lost. Many similar cases might be cited if it were necessary. In regard to general ventilation, much improvement had of late years taken place, especially in Northumberland and Durham; and although there was far more coal worked there than in any other coal-field in England, there were fewer accidents, the greater number of explosions occurring in Yorkshire and South Wales, where less attention was given to ventilation. Of course no one system was of universal application; as different districts possessing different circumstances, required different plans; but if the same attention were given to the subject in other places as had been given in Northumberland, fewer accidents would occur. The amelioration which had there taken place, in dividing the current of air at the bottom of the shaft, and causing it to pass into different districts, shortening the length of the circuit, and reducing the number of doors, and keeping up large furnaces, had almost removed explosions from defective ventilation in that district. Still, however good ventilation might be, it was not the less necessary to insist on the use of the "Davy." He knew that there was a prejudice against it amongst colliers; the old one with the wire gauze did give a bad light, but there were modifications of it not open to the same objection. He approved of the glass lamps, as he thought they afforded sufficient security, and no objection could be made to the light given by them. In Belgium, nothing else was used; there the miners would not work on any consideration with naked lights, and until safety lamps were universally used in England, we must expect to have more or less explosions.

The Chairman asked Mr. Blackwell which of the varieties of the Davy Lamp he considered the safest and most effective.

Mr. Blackwell said, that for going into an atmosphere of an explosive or doubtful kind, for the purpose of testing, the Davy Lamp, as left by Sir Humphrey Davy, was the most delicate instrument. But for ordinary purposes the glass lamps commonly used in Belgium, were, he thought, the most useful. There was a modification of the solar lamp applied to the same purpose, which gave an excellent light.

Mr. Ikey said, it had been long admitted that the Davy Lamp was no safety lamp at all, because when hydrogen gas was present, it could get through the wires and ignite. Although of late years there had been much improvement in colliery ventilation, especially in Northumberland, still there were very many explosions. He had recently submitted a plan to the Institute of Mining Engineers, at Newcastle, for exploding the foul gas by means of gunpowder, before the miners entered the pit; he proposed to do this by the aid of electricity, and to have it repeated every twelve hours, or oftener; the effect would be to remove a portion of the hydrogen, and so keep the air below the explosive point as effectually as by increased admission of atmospheric air. He had received a letter from the chairman of the Institute, who was going to have the experiment tried.

Mr. Blackwell said the last gentleman misunderstood him if he thought he depreciated the importance of ventilation; but he must still insist on the necessity of using the "Davy." He thought it was only fair to ask that gentleman if he could point to a single instance in which a colliery explosion had occurred in which the Davy Lamps had been exclusively used, under proper regulations? He (Mr. Blackwell) knew something of these things, and did not remember one. There was but one disputed case,—that of the explosion at the Haswell Colliery; and in reference to that, evidence was tendered before the House of Lords, to the effect that the explosion did not result from the use of a Davy Lamp. Hundreds and thousands were daily going into explosive atmospheres with this lamp; he had done so himself, and knew of no accident.

Mr. Warrington Smyth could not claim to have so intimate an acquaintance with the subject as Mr. Blackwell, but having had some experience in connection with several collieries, he would make a few remarks. The paper which had been read presented a very fair sketch of the subject, but a sketch that would be very imperfect without the addition of a large number of notes. The author of the paper appeared to have been describing the state of the collieries in the north thirty or forty years ago, before the improvements had been commenced. When he spoke of collieries having only one shaft divided down the centre by a brattice, so that one portion might be used as the upcast, and the other as the downcast shaft, he referred to a thing that was beginning to be very uncommon indeed. The length of the air-courses, also, which used to be about thirty or forty miles in extent, was now much reduced; and the system of splitting the current of air, and

making it traverse shorter circuits, was now commonly adopted. He fully coincided with Mr. Blackwell in his remarks as to the use of the "Davy." In all collieries there were some portions of the workings much more dangerous than others, and it was frequently the custom to have these dangerous parts separated from the rest of the mine by doors, which were guarded by persons who had strict instructions to suffer no one to enter with a naked light. Where this was done, explosions never occurred. But in others the discipline was more lax, no rules or regulations were observed, and explosions were not uncommon. In the northern collieries, where the subject of ventilation, both theoretically and practically, had occupied the attention of such men as Mr. Potter, and Mr. Nicholas Wood, explosions seldom occurred. In reference to the idea of ventilating a coal-mine by means of pipes at the upper part of the seam, he was surprised that any one should recommend such a plan, when it was known that the air-courses were required to be of great area, and that large bodies of air were continually traversing through them. The author of the Paper threw a little too much blame on those collieries which were left to natural ventilation; as, during a great part of the year, it was a very powerful means of ventilation, especially when the two shafts were of different depths. In confirmation of this, he referred to an experiment, at which he was present, made by Mr. Nicholas Wood, who was trying the relative advantages of the steam-jet and a furnace; and they found that the natural ventilation alone, without the aid of either, gave a current of as much as from 10,000 to 14,000 cubic feet of air per minute. It was manifest, however, since circumstances varied so much in each mine, success could only be secured by the careful judgment and enterprise of the respective managers of the collieries; and any one who read the voluminous reports from the Mining Institute of the North would see how much was being done to improve the condition of the mines there, and he trusted the results of such efforts would spread throughout all the colliery districts in the kingdom.

Mr. Edward Simons, of Birmingham, exhibited and explained two improved safety-lamps. The first was the common "Davy," with the addition of a self-acting extinguisher, which served also as a reflector. When a miner attempted to uncover his lamp for the purpose of obtaining more light, or for lighting his pipe, the extinguisher was immediately brought into action, and put out the light. The second lamp also possessed this self-acting extinguisher, with the addition of several other improvements, by which a brilliant light and perfect safety were combined. He regretted that several colliery-owners who had seen them, although they admired them much, made the extra expense an objection; but he thought the difference between 5*s*. or 7*s*. and 15*s*. ought not to be weighed against human life. He expressed his readiness if, on trial, they were found as effective as he believed they would be, to give up his patent right, and throw their manufacture open to public competition, so as to bring them to the lowest possible price. This announcement was received with much applause.

The Chairman expressed the thanks of the meeting to Mr. Simons for such a liberal offer. He felt a deep interest in the subject, and had taken some pains to promote the proper regulation of mines. Four or five years ago he obtained a Committee in the House of Lords, who sat in 1849, and collected some valuable information, which had led to increased attention to the subject. It had the very satisfactory result of enabling them to press the Government to take steps for the establishment of inspectors to ascertain the actual condition of the mines in different parts of the country. Soon after that an Act was passed for the appointment of inspectors, which had had a very beneficial effect, the only drawback being that the inspection was not quite extensive enough. Many objections had been urged against allowing the inspectors power to enforce any particular mode of ventilation, as it was impossible for them to possess the knowledge of the circumstances of each colliery—the depth, thickness, dip, quality, &c., &c.—so well as the resident managers. Another objection to such a power would arise from the fact that it would be transferring the responsibility from the proper parties. The inspection had done this especial good, it had called attention to persons who were careless, and it had helped to spread the best information throughout the country, and he trusted that the result of the awakened and continued attention to the subject would be a decrease in the very lamentable accidents from colliery explosions. He concluded by moving a vote of thanks to Mr. Blackwood for his interesting paper.

Mr. Winkworth proposed a vote of thanks to his Lordship for his able conduct in the Chair, which was duly passed and acknowledged.

It was announced that, at the next meeting, on April 20th, two papers would be read, the first by Messrs. Mordan, "On Mr. Denison's New Lock;" and the second, by Mr. W. H Tucker, of Tiverton, "On a New Improved Lock."

PHOTOGRAPHIC INSTRUMENTS.

Photography may fairly be said to have broken upon the world without an introduction. The means of obtaining photographic pictures, although greatly improved in so far as chemistry is concerned, are yet so far deficient as that the camera itself and the principles of its construction have been but slightly modified. The art has, with few exceptions, been practised only by amateurs, the cameras employed being little else than oblong square boxes, with a single lens at one extremity; and each practitioner has worked in ignorance of what others were doing. The camera to this day, although introduced into England in 1839, is, so far as the general public is concerned, a thing unknown. Such was proved to be the fact, by the Exhibition of Photography held at Christmas last; the almost universal inquiry being, How are these pictures obtained? and resulting in a request that the Council of the Society of Arts would cause a collection of the instruments and materials employed to be made and exhibited.

The collection of cameras now open to Members and their friends, illustrates all the most recent and improved principles of construction, and suggestions for the use of new materials and combinations by which their efficiency, portability, and extent of application may be increased, at the same time that their cost is diminished.

The cameras included in the collection are contributed by Messrs. Archer, Claudet, P. De la Motte, G. Edwards, P. W. Fry, Henneman, Highley, jun., Horne, Thornthwaite, and Wood, Knight and Sons, W. E. and F. Newton, Professor Maskelyne, M. Swann, &c., and divide themselves into three classes; namely, the Box, the Folding or Portable, and the Operative Camera, or Camera in which, or in connection with which, the chemical portion of the art may be performed.

Of the cameras exhibited, those by Messrs. Henneman, Horne, Thornthwaite, and Wood, and Messrs. Knight and Son, are in most general use, and are constructed so as to afford facilities for increasing or decreasing the focal length of the camera by constructing the box upon the telescopic principle; that by Mr. Henneman has also a revolving and double-adjusting disc in which the lens is placed, and by means of which the upper portion of a building, not previously in the field of view, can (without altering the focus of the camera), be adjusted.

Of the three cameras exhibited by Messrs. Knight and Son, that of the most novel construction is on a combined principle, being adapted for long or short-focused lenses, being fitted with a Voigtlander lens, No. 3, which can be used in combination for portraits or groups, or the front lens can be used singly for views, producing a well-defined picture eleven inches in width. The camera is portable, being constructed to pack in a portmanteau. The greatest length of the camera is employed with the single lens, for taking views; but to adapt it for the lenses, when used in combination, the front end is taken out, and a portion of the top and sides fold down, when the front end is again replaced with the combined lenses, and it is ready to be operated with.

Of the second class, or Folding Cameras, those invented by Mr. Edwards and Mr. Stokes (the latter exhibited by Mr. De la Motte) are on the most novel principles, the body of the cameras being made of black cloth or waterproof materials, impervious to light; each is capable of being packed into a very small space, and the latter has a wooden frame, affording great facilities for carrying a large quantity of prepared paper at the back of the camera, and for changing it without subjecting it to the action of the light; while that by Mr. Edwards is constructed entirely of metal, covered with "cording," or waterproof cloth, and has perfect rigidity of parts. The foundation of this instrument is a brass tube 1¼ in. diameter, the centre of which screws on to a ball and socket joint, which terminates in the stand. On one end of the tube is a light frame of brass, merely sufficient to receive the plate-box; at the other end is a small frame to hold the lens, fixed on a slide for adjusting the focus. Four wires, which can be firmly clamped, extend from one frame to the other, and keep the covering material in its proper shape; a diaphragm in advance of the lens has its shade tube formed also of "cording." The wires when withdrawn pack in the tube, and the small end with the covering, packs in the larger end. The total bulk is 4 cubic inches to each square inch of picture, and the weight 1½ oz. to the same area of picture, being 76 per cent. of the area of the largest end of the camera; these results would be still more favourable in large cameras. A looking-glass to show the picture erect, enables the legs to be short and the curtain small.

In the class of Portable Cameras must be included that of Professor Maskelyne. It is an ordinary oblong box, with telescopic adjustment for focusing, which operation is performed within and from the back of the camera. This also affords considerable facilities for carrying a quantity of prepared paper, which being placed in a box packs in the camera, while a second box containing the chemicals necessary for developing the picture, also packs within the camera. A third box, containing brushes and the other implements and materials, is placed on the top. The lens is capable of a vertical adjustment after the focus has been set, affording facilities for cutting off, or increasing, the foreground of the picture. The whole apparatus, with a tent or screen, packs into a Mackintosh cover.

The third class of cameras exhibited are those adapted to the Colodion process, which, owing to its extremely rapid action, requires to be carried on during the development of the picture, in a dark chamber. Cameras in this class are exhibited by Mr. Archer, and Messrs. W. E. and F. Newton. In the former case, the frame of the camera is long enough to afford, when covered with waterproof cloth, sufficient room within the camera for carrying on the different processes of development; while in the camera by Messrs. Newton, a series of baths are placed, either within or below the camera, and the glass or plate to be operated upon is attached to a moveable vertical rod sliding through a socket fixed to a graduated bar, and by the combined action of which the plate may be brought over, and immersed in, any required solution without exposure to the action of light.

The camera exhibited by M. Claudet, is constructed with two racks and pinions at right angles to each other, for giving motion to the focusing plate, enabling it to be so adjusted as to admit of eight or more portraits being taken upon one plate, when it is not desirable to group them, as is usually the case in family pictures.

The camera, by Mr. S. Highley, jun., possesses three points of novelty; viz., a sliding top, to admit of the plate-holder being adjusted to a short or long focus; a tent adapted to the camera-stand; and an adjustment for microscopic object-glasses.

The collection also includes several other instruments used in the art; viz., a Focimeter, for determining the difference between the lenticular and actinic foci; a Photographometer, for measuring the power of light, or determining the relative sensitiveness of different plates; and a Dynactinometer, for determining the relative quickness of action of different lenses, by Mr. Claudet; also, printing frames, stereoscopes, &c., on many different principles of construction. The camera stands are variously constructed, so as to combine rigidity with portability. The collection will remain open till the end of the present month, and may be viewed upon the presentation of a written order, signed by a member.

ON FIXING PHOTOGRAPHIC DRAWINGS.

We have received from an amateur, who states he has "never yet seen the productions of any other person," some calotypes, which are to a certain extent successful. They exhibit, however, many of the faults which mark the productions of the inexperienced operator; and we are therefore induced to offer a few suggestions which may be of assistance to our correspondent, and others similarly situated.

In the first place, the specimens before us bear the evidence of having been obtained with a very imperfect lens—we should judge from appearances, a lens which has not been made for a Photographic Camera. Now, the peculiar conditions of the agent by which these pictures are produced, demand the use of lenses which have been constructed with due regard to certain known principles; otherwise a perfectly flat field, and distinctness up to the edges, cannot be obtained.

It is a mistake to attempt to adopt an ordinary lens to a photographic camera; as, by so doing, failure must follow upon failure, and the production of a good photograph is rendered impossible.

Our correspondent complains of the injury which his pictures receive in the process of fixing with the hyposulphite of soda, and regrets that some more perfect method cannot be discovered.

We believe it will be difficult to discover any chemical agent superior to the hyposulphite of soda, which, when properly employed, ensures the utmost degree of permanence to the photograph under any circumstances of exposure. To place this clearly before our readers is our object.

1. The hyposulphites are remarkable for their property of dissolving several of the salts of silver—such as the chloride and iodide—forming with them compounds which are distinguished by their peculiar sweetness. *Negative* Talbotypes consist of an iodide of silver over all those parts which are not darkened; and of metallic silver in a state of minute division over the darkened portions. Positive pictures only differ from negatives in the general use of the chloride of silver, instead of the iodide. In either case the unchanged silver salt is to be removed, and the darkened portions disturbed as little as possible. In the process of change under the influence of the solar radiations, oxide of silver appears to be formed at first; the oxygen is then liberated, and metallic silver is the final result. If much oxide of silver remains on the paper, the hyposulphite of soda will dissolve some portions of it, and thus injure the picture. This is shown by the more energetic action of the hyposulphite on the positive than on the negative pictures. In the latter, by the action of the Gallic acid, or the protosulphate of iron, the complete deoxidation of the silver salt is effected. In the former, this is not the case where the exposure to sunshine has been short, or where the copy has been made by the effect of diffused daylight.

Positive photographs which are made when the sun is shining brilliantly, are far less liable to injury than such as are procured by the weak and uncertain light of a wintry day, although they may in both cases be brought to the same apparent degree of darkness.

2. As a general rule, it is advisable to expose the positive to sunshine longer than it is necessary to do, for the production of a well-defined image. If the picture has been rendered *far too dark* to be pleasant, it can be *toned* back, to use an artistic phrase, by very weak solutions of the iodide or cyanide of potassium.

3. The photograph being removed from the copying frame, or the camera, should be first placed in some clean water, to which a small quantity of common salt has been added. By this all the free nitrate of silver is converted into a chloride; and the formation of any sulphuret of silver in the paper, by the action of the nitric acid on the sulphur salt, prevented. The picture should, after it has soaked for a little time, be removed and placed in a solution of the hyposulphite of soda, in a flat dish—about an ounce of that salt being dissolved in a quart of water—it should remain in this fluid for five or ten minutes, and then be removed to a vessel of perfectly clean water.

4. It is thought by many photographers that the addition of some chloride of silver to the hyposulphite of soda prevents its acting on the more delicate shadows of the picture. Whether this is the case or not is somewhat uncertain; but the hyposulphite solution can be used a great many times, if after using it is poured back into a bottle, and kept from the air.

5. It becomes necessary now to remove every trace of the hyposulphite of soda and silver from the paper. Many persons are content with soaking their pictures; but by far the best practice is, to place the photographs upon a flat board, incline it to an angle of about 45°, and allow water slowly to fall upon and flow off from the pictures. By this means the salt is removed far more rapidly than by soaking and changing the water, however carefully this may be done. Even after this the safest course is, to place the photograph in some clean hot water, to which a little potash has been added. This secures the removal of the last trace of the hyposulphite, and it darkens again those lines in the photograph which may have been injured by chemical action, as above described.

6. By attention to these details photographs may be fixed most permanently, without their undergoing any serious injury. The addition of neutral chloride of gold to the hyposulphite of soda bath, tends to produce a variety of purples approaching almost to black, which are of a very pleasing character. Similar results may be obtained by soaking the picture in a weak solution of the chloride of gold, upon removing it from the fixing fluids.

7. The experience derived from the photographs displayed at our late Photographic Exhibition, some of which have since been presented to the Society, convinces us that sufficient care is not generally given to secure the perfect permanence of a fine positive photograph. By the combined influence of a moist atmosphere and light, changes slowly go on from the edges of the paper spreading inwards, which eventually destroy the picture, if there is the slightest trace of the hyposulphite of silver allowed to remain on the paper. The taste is the best test that we can apply; and if after a picture has been well washed in several perfectly clean waters, we take one corner of it into the mouth and suck out some of the water, without discovering any metallic sweetness, we may be sure that our photograph will endure as long as any ordinary print.

TAXES ON KNOWLEDGE.

In the House of Commons, on Thursday evening, Mr. Milner Gibson called the attention of the House to the following Resolutions:

1. That the Advertisement Duty ought to be repealed.

2. That the policy of restraining the cheap periodical press from narrating current events, by rendering it liable to stamp duties and other restrictions, if "any public news, intelligence, or occurrences, or any remarks or any observations thereon" be contained therein, is inexpedient, and at variance with the desire now generally expressed in favour of the diffusion of knowledge amongst all classes: and it appears also to this House, that the law relative to taxes on newspapers, and other regulations affecting public prints, is in an unsatisfactory state, and demands the attention of Parliament.

3. That the Excise duty on paper, whilst impeding the development of an important manufacture, also materially obstructs the production of good cheap literature - and the maintenance of this tax as a permanent source of revenue would be impolitic and inconsistent with the efforts which Parliament is now making to promote education amongst the great body of the people.

A debate ensued, in which the resolutions were seconded by Mr. Ewart, and supported by Mr. Bright, Mr. Disraeli, Mr. Cobden, Mr. J. L. Ricardo, Mr. J. M'Gregor, Sir J. Pakington, and others; and opposed by the Chancellor of the Exchequer, Lord J. Russell, Mr. Sidney Herbert, and Lord Robert Grosvenor. On a division, the proposal to repeal the Advertisement Duty was carried by a majority of 31; that to repeal the Stamp Duty was rejected by a majority of 182; and that to repeal the Paper Duty was rejected by a majority of 195.

APPLICATION OF THE PARLIAMENTARY GRANTS IN AID OF INSTRUCTION IN ART, FOR THE YEAR 1853-4.

THE following important Minute has just been issued by the Board of Trade:

My Lords take into consideration the estimates about to be submitted to Parliament for affording aid to the Local Schools of Art, during the year ending 31st March, 1854.

At the establishment of the Schools, it was understood that a Government grant was promised for a limited period of three years, upon the condition that a sum equivalent to it was raised in the locality, and, in the expectation that after three years the Schools would be so established and supported as not to require any further assistance from Government. These expectations have not been fulfilled; but, on the contrary, the tendency of the system, until very lately, has been to encourage increased reliance on Government aid, rather than upon the value of the instruction or local exertions, and has been found adverse to economy. My Lords are of opinion that by more judicious arrangements it may be possible greatly to increase the advantages which now result from the outlay of so large a sum of public money; and while they do not propose to withdraw grants from the places which now receive them, they are desirous to introduce a system of greater efficiency and economy, by which the independence of the local bodies may be increased, and the objects of the Parliamentary Vote more adequately attained. My Lords desire to relieve the localities altogether from the obligation to raise a sum equivalent to the Parliamentary Vote, and instead, to leave the whole general management, and the control of the cost of it, entirely to the Local Committees. In future, the Local Committees will not be required to return to this Board any account of their local expenditure, or of any receipts from subscriptions or donations; each Local Committee will therefore determine for itself what premises shall be used—subject, of course, to their being considered by My Lords as suitable for the purposes of instruction;—what rent shall be paid, what furniture provided, what managing officers, servants, &c., shall be engaged, and what shall be the cost of general management.

My Lords, on their part, propose to confine the Parliamentary Grants wholly to the promotion of instruction, and even in this point to exercise control only so long as the Local Committee elects to receive the parliamentary aid. Their Lordships would view it as the highest mark of the progress and success of art education, in any locality, to find that the Committee preferred independence of the Government Grant altogether.

My Lords will require that the Parliamentary Grant for the year ending 31st March, 1854, should be paid to the following objects: the present masters' salaries; an increase of masters where necessary, especially for affording instruction to public schools; pupil teachers; and to deserving students in holding scholarships, both in local and metropolitan schools, and to students in training to become masters; lectures, and examples for teaching. After communication with the Local Committees, My Lords will apportion the Grant to these respective items.

As the fees paid by the students may be considered as the product, partly, of the Grants furnished by Parliament, and partly of the funds raised in the locality, My Lords will require, as a condition of receiving any parliamentary aid, that an equitable portion of the fees shall be applied towards instruction, and in accordance with their Minute of the 28th January, 1853, and for the reasons given in the letter of the 30th June, 1852, which has been sanctioned by the Lords Commissioners of Her Majesty's Treasury, they propose that such portion of the fees shall be paid to the master or masters of the school, as part of their income.

HENRY COLE, *Secretary.*

HOME CORRESPONDENCE.

DUTIES ON PAPER, NEWS, ETC.

Chalcots, Hampstead, April 6, 1853.

SIR,—In answer to your inquiry, and in compliance with your request, I can have no hesitation in expressing the conviction to which I have been brought by painful experience, regarding the paper duties; namely, that they operate powerfully in checking the progress of popular literature, and consequently in obstructing the otherwise untrammelled, and only untrammelled, means of education which exists in this country. I cannot believe that anything but want of knowledge of the operation of the paper duties could allow any man to speak of their pressure as trifling and inappreciable. Such would be the case if only expensive books were published. As the case actually stands, our literature having undergone a great revolution, so as to make cheap books the rule and dear books the exception, the pressure of this tax is so severe as absolutely to prevent publications from taking place which otherwise would see the light. If any gentleman accustomed to speak of it as a trifle were present at one of the business councils which occasionally take place at the printing-office in Edinburgh with which I am connected, and heard how fractions in the price of paper, far within the limits of this tax, told in encouraging and discouraging plans of cheap periodicals designed for the instruction and innocent entertainment of the people, and reflected how every such work of pure character is so much deducted from the means and temptations of corruption,—and every failure or withdrawal of such works is in reality the yielding of a piece of ground to the devil,—he would come to think of this treasured piece of the Chancellor of the Exchequer's possessions in a different light from what he has been accustomed to. One would have thought that the business of literature, so noted in all times for its struggles and its sufferings, and yet conferring such large benefits on mankind, would have been deemed sacred in so enlightened a country as this from fiscal oppression, while a single other article of common use remained untaxed. One would have expected at least to find all journalists unanimous in arguing for its exemption. That such is not the case can only, I think, be attributed to some secret sensitiveness in a portion of the press regarding the associated question of the newspaper stamp. I am therefore glad to find that a disposition now exists in some quarters to separate the one question from the other, and plead for the abolition of the paper duties alone. I believe that the dismissal of the stamp would also be favourable to the education of the people; but I must admit that there are some arguments of considerable force for its being retained; and, any how, we should be in a more hopeful position for attaining the *unmixed good* of an abolition of the paper tax, if we were quit of that semi-political question.

You are doubtless aware of the many strong arguments that have been brought forward in favour of th abolition of the advertisement duty. There is one

to which I would fain draw attention, as the interests of literature are much concerned in it. It consists in a simple fact which I took all possible care to ascertain; namely, that the poor trade of authorcraft pays annually, in the form of duty on book advertisements in newspapers, the large sum of *twenty thousand pounds!* Contrast with this the encouragement which it gets from the State!

I am,
Yours very faithfully,
R. CHAMBERS.

COMMUNICATION BETWEEN GUARDS AND ENGINE-DRIVERS.

SIR,—Mr. Francis Whishaw, in the Journal of the Society, No. XI., calls attention to a plan he recommended some thirteen years ago, as adopted on the Brighton Railway. In the following Number of the Journal you were pleased to give the public the benefit of my "reflection" by appending it to Mr. Francis Whishaw's simple and effectual contrivance of the bell, by which when the guard or driver could not *hear*, they would *see*. In No. XIX. you have very fairly given the result of the "Conclave of the Board of Delegates from the Railway Clearing-house" (and which also occupied some column and a half of the *Times*), stating, "no signals depending on sight or distant sound, or on complex contrivances of any kind, can be so adapted to make the communication at all times certain," and therefore advise a mode "which must have the quality of simplicity of construction." Your readers need only follow the remarks of "Inquirer" (in the same Number), to determine for themselves and the public "the crude and ill-considered scheme," as "Inquirer" terms it, as to simplicity and certainty of action. Although I do not admire "Inquirer's" allusion of "*ésprit de corps*," &c. Gentlemen may be mistaken; but I am certain you, Sir, will agree with me, that those constituting the Board of Delegates could only be actuated by very different considerations. However, permit me to make one or two remarks upon the conclusion to which the Board of Delegates arrived. As to "signals depending on sight not being at all times certain," I am certain that you, as well as the public, will agree with me, if signals depending on sight should be perfect for three hundred days out of the three hundred and sixty-five in the year, it would be a lamentable dereliction of duty on the part of any Board or Legislators to prevent the safety so far to the travelling community. By the means recommended by Mr. Whishaw and myself, you can not only communicate at *all* times, and enable the guard and engine-driver to *hear* as well as *see*, but in almost every case you can at the same time *tell* them what each requires; and the only instance where the bell is preferable is in a fog. By night, or in a tunnel (except in a fog), the coloured lights would indicate, without the use of the bell, whether the driver was to stop or go cautiously, and the white light that all was right, without the necessity of the driver leaving his seat; and by daylight, the reflection in the looking-glass, the usual signal from the guard, holding up the right or left arm, or both, would perform the same duty, which would be immediately seen by the engine-driver. To add to the safety of the public, there should always be *two* guards; one in the rear of the train, with a powerful brake, carriage, or van,—the brake acting upon the rails, and not upon the wheels of the carriage; and another guard in the centre of the train, sitting sideways in his box, the part of which is elevated (above the roofs of the carriages). Two other looking-glasses should be placed immediately in front of him, each at an angle of 45°, by which he could at all times see what was passing, either in front or in the rear of the train. These suggestions followed out, the cost of which would entail but the outlay of a few shillings, would perform nearly all the duties desired. The attachment to the bell must not be by *gutta percha*, but by a stout wire over the tops of the carriages, with a short length of chain to either end, with a *clasp-hook*, permitting the coupling between each carriage, as it is now universally practised through out the kingdom.

I am,
Yours very truly,
JOHN BRAITHWAITE.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ROYAL INSTITUTION, April 4th.—At the General Monthly Meeting, W. Pole, Esq., F.R.S., Treasurer and Vice-president, in the chair, Sir J. Matheson, Bart., M.P., F.R.S.; W. Bigg, Esq.; P. Carther, Esq.; M. Leake, Esq.; W. Pinney, Esq., M.P.; and J. White, Esq., were elected members.

ROYAL GEOGRAPHICAL SOCIETY. April 11.—Sir Roderick I. Murchison, F.R.S., President, in the chair. A paper on "Oceanic Currents, and their influence on the Central American Canal," by Alex. G. Findlay, Esq., F.R.G.S., was read. After a brief reference to the progress of the subject of currents from its origin, by Major Rennell, in 1778, to the publication of his "Investigation," published in 1832, the author proceeded to point out some deficiences in the system as then established, and showed that the waters of the Atlantic circulated around a space having the parallel of 30° N. as its axis; that a portion of the Gulf-stream flows to the N.E., and ameliorates the climate of the British islands and Norway, without which influence they would be assimilated to Labrador and Greenland. The peculiarities of the Gulf-stream recently elicited were described; a nearly perpendicular wall of warm water in juxta-position with the cold Arctic waters flowing southward, between it and the coast of the United States, and another and parallel branch to the S.E. of it was noticed. The somewhat similar arrangement in the South Atlantic was alluded to, of a current revolution around the parallel of 30° S. The anomalous character of the Guinea current was cleared up by an analogous current in the Pacific, not hitherto noticed. This portion of the subject was illustrated by a large diagram, in which the currents and their polar or tropical origin were very clearly marked. In describing the currents of the Pacific, the subject was a new one, and, at least, two currents of very great magnitude had not yet been noticed, or only indirectly hinted at. A very large engraved chart contained the data. It was shown that the waters from the antarctic pole flowed slowly northward and eastward, towards the lat. of 28° N.; that a portion of these cold waters struck the west coast of South America, or about the parallel of 40° S., and dividing, one branch flowed south and east, forming the eastern Cape Horn current; and the other ascending the coast, as a remarkably cold stream, was called the Peruvian or Humboldt's current; reaching to near the American isthmus, it turned past the Galápagos islands, where many singular effects were produced, but that at times a portion continued northward and flowed on to Panama. The Peruvian current flows on westward, and forms the initial course of the great southern equatorial current, between 40° N., and 26° S., which, passing the Pacific archipelagoes, has many anomalies, but a por-

tion striking the coast of Australia has a precise relation to the Brazil current in the South Atlantic, and circulates around the space between Australia and New Zealand. The North Equatorial Current is not well defined at its eastern end, but flows strongly towards the Philippine Islands, across the ocean between 10° and 24° N. lat., whence it turns northward towards the coast of Japan. It then forms the impetus to a current not found on physical charts, and which was here named the Japanese Current, from its analogous relation to Florida and the Atlantic Gulf Stream. This Gulf Stream of the Pacific was then traced by direct observation and inference, from numerous authorities who were quoted, across the entire breadth of the Pacific, to the N.W. coast of America. Its effect on the climate of Sitka and Prince William's Sound were shown to be similar to that on the coast of Norway. The temperature and the wrecks of Japanese junks, the drift of timber to the Sandwich Islands, &c., proved the circulation of the waters around the lat. 30°, to be the same as in the other thermal systems described. The ocean waters flow southward, down the American coast toward the Bay of Panama, or the Great Bight, formed by the American Isthmus; and the new and very important current was then described, and the numerous authorities on which it might be established were quoted. It is a zone of *easterly* drift, between lat. 50° and 60° N., extending all across the Pacific, from the Pellew Islands nearly to the Bay of Panama, and was named the Equinoctial Counter Current. This singular current has an exact relationship to the Guinea Current, on the opposite side. The origin of this was supposed to be due to the action of the N.N.E. and S.E. trade winds, which, forcing the waters up to these latitudes, caused them to reverse their normal action; and thus the waters appear all to flow toward that one point, of such great interest at the present time. The navigation about Panama was shown to be very critical and difficult. Respecting the question of the level of the two oceans, if it were not for the counter current it might be reasonably supposed that the Atlantic would be several feet higher than the Pacific, from the waters in each ocean being drifted to their western sides, but which are thus almost exactly balanced. After some complimentary remarks from the President, the meeting was adjourned.

PROCEEDINGS OF INSTITUTIONS.

ALTON.—Recently a lecture was delivered at the Mechanics' Institute, on "The Scenery of the Pyrenees," by Mr. C. James, of Cambridge. The lecturer led his audience from Nismes, along the chain of the Pyrenees, to Pau, describing the chief points of interest, and the principal incidents of adventure in his route. The most striking portions of the scenery were illustrated by a set of transparent paintings—Maladetta, Mont Perdu, the Lac Bleu, and the Peak du Midi, standing out conspicuously amongst the peaks, passes, gorges, and ravines, of that romantic region.

DURHAM.—The first lecture under the auspices of the Society of Arts, was delivered in the lecture-room of the Mechanics' Institute, on Monday evening, by William Hughes, Esq., F.R.G.S.. &c., subject, "Earthquakes and Volcanoes." The lecturer said, that the subject of earthquakes and volcanoes related to the disturbing agents continually in operation, and continually modifying in various forms the external features of the earth. They were manifestations of the heated nature of the earth; because direct experiments upon the temperature of the strata of the earth, in any part of the world, showed a continually higher temperature as they descended below the surface of the earth, in the proportion of about 1° of Fahrenheit's thermometer to fifty-four feet of perpendicular descent. The phenomena under discussion might be regarded as evidence of a fluid condition of the earth's mass, owing to the intensity of heat in the internal parts of the earth, and the development of subterranean heat issuing from them; and the action of that heat upon large bodies of air imprisoned in cavernous recesses below the ground, was the proximate cause of earthquakes, in one form of action, or of eruptions of volcanoes in another—of gas below the surface of the ground, in one form of action heaving up in earthquakes whole masses of solid rock which form the earth's crust, or in the other, bursting open the crater of the volcano, and by means of that vent, discharging from the interior of the earth various forms of matter. By means of a map, the lecturer then pointed out the geographical positions of the regions most subject to earthquakes and volcanoes. There were differences, he said, in the particular modes in which earthquakes and volcanoes manifested their action. The earthquake, as its name implied, was a disturbing of the solid ground; whereas a volcano was generally truncated, and at the top was a deep hollow towards its interior. A vote of thanks to Mr. Hughes was carried by acclamation.

DARLINGTON.—The Report of the Committee for the past twelve months states that the library, news and reading-room, has been more extensively resorted to than at any previous period; four classes have been established; and a series of instructive lectures have been delivered. The present number of members is 400, showing an increase of 21 over the previous year. An addition of 211 volumes has been made to the library, making a total number of 1,818 possessed by the Institution. Since the last general meeting, the Committee have directed much attention to the new building. Contracts for its erection have been agreed to, and it is expected that in January, 1854, possession will be obtained. The entire cost will be about 2,200*l*., the half of which amount has already been subscribed.

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

"A."—A travelling porter, occupying the position recommended by our correspondent, has for some time past accompanied the express trains on the Great Western Railway, in addition to the ordinary guard.

Erratum.—In page 238, "Questions from Correspondents, No. 53," for "rich clothes," read "rick cloths."

QUESTION FROM CORRESPONDENT.

Flooring.—"What is the most economical composition for flooring; the manner in which it may be laid down, and the expense per square foot?" [No. 55.]

MISCELLANEA.

COLONIAL POSTAGE.—The Council of the Postage Association has determined to set aside, for the present, the proposition for a Penny Colonial Postage, and to exert all its influence in inducing Ministers to adopt at once a uniform rate of *three pence* for a half-ounce letter to any of our Colonies. The Government proposition calculates a penny inland rate on each side, and fourpence for the ocean transit. This latter item the Association proposes should be reduced to one penny, thus adopting the Inland Rate proposed by Government, and the Ocean Penny Postage of Mr. Elihu Burritt. The Association has asked the Earl of Aberdeen to receive a deputation on the subject, and his Lordship has appointed Saturday, the 16th instant, at 1 o'clock. It is expected that the deputation will be very numerous and influential.

DECIMAL COINAGE.—On Tuesday, Mr. William Brown moved for a select committee of the House of Commons, which was agreed to, to take into consideration and report to the House the practicability and advantages, or otherwise, that would arise from adopting a Decimal system of coinage. The following gentlemen are to constitute the Committee:—Mr. William Brown, Mr. Cardwell, Mr. John Ball, Mr. Tufnell, Mr. Alderman Thompson, Mr. Dunlop, Mr. Matthew Forster, Lord Stanley, Mr. Moody, Mr. Hamilton, Mr. John Benjamin Smith, Sir William Clay, the Marquis of Chandos, Sir William Jolliffe, and Mr. Kinnaird.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 6th April.*

253. Railways—Return.
261. Civil Services—Estimates, Classes 1 to 6.
262. Civil Contingencies—Account and Estimate.
264. Kaffir War (Cape of Good Hope)—Estimate.
267. Municipal Charters—Return.
273. Rochester Consistory Court, &c., and Ecclesiastical Courts—Return.
280. Brighton Municipal Charter—Report by W. Forsyth, Esq.
Australian Mints—Copy of Treasury Minute.
Australian Colonies (Alterations in the Constitutions)—Further papers.

Delivered on 7th April.

185 (1). Cambridge Election—Index to Minutes of Evidence.
263. Commissariats—Estimate.
261. Civil Services—Estimates, Classes 2, 3, and 4 (corrected pages).
283. Bill—Clergy Reserves, Canada (amended).
Sir James Brooke—Further papers.

Delivered on 8th April.

284. Commissariat Chest—Account.
252. Railways (Passengers conveyed, &c.)—Return.
293. Trade and Navigation—Accounts.
Clergy Reserves (Canada)—Further papers.

Delivered on 9th and 11th April.

191. Local Acts—Reports of the Admiralty.
209 (1). Kingston-upon-Hull Election—Index to Minutes of Evidence.
305. Committee of Selection—Fifth Report.
310. Railway and Canal Bills—Fourth Report from Committee.
286. Writs of Distringas, &c.—Return.
291. Kilmainham Hospital—Papers (Reprint of No. 331 of 1834).
298. Arterial Drainage (Ireland)—Treasury minute.
246. Railway and Canal Bills—Third Report from Committee.
309. Bills—Brecon Collegiate Church.
307. ,, —Education.
Meteorological and Hydrophical Observations—Papers.
Department of Practical Art—First Report.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 8th April, 1853.

Dated 7th March.

575. A. Carosio—Electro magnetic apparatus for motive-power, light, and heat.

Dated 23rd March.

705. J. Allen—Safety-valves.
706. J. H. Park—Water-closets, &c.
707. J. B. Massat—Manufacture of knives, &c.
708. B. Boyle—A centripetal flange.
709. H. Hughes and W. T. Denham—Improvements in organs, seraphines, &c.
710. W. M. Crosland—Blockmaking machinery.
711. A. F. J. Claudet—Stereoscopes.

Dated 24th March.

712. C. W. Siemens—Rotatory fluid-meters.
713. J. Beaumont—New manufacture of woven fabrics.
714. W. P. Sharp—Machinery for spinning and doubling cotton, &c.
715. R. Grundy and J. Jones—Machinery for preparing, spinning, and doubling cotton, &c.
716. C. V. F. de Roulet—Manufacture of piled fabrics, and warping machine, &c.
717. H. Webster—Gas stoves.
718. W. Keates—Manufacture of tubes and mandrils. (Partly a communication).
719. C. A. Holm—Propelling vessels.
720. G. J. and D. Jackson—Fasteners for buttons.
721. W. M'Naught—Steam-engines.
722. W. Edie—Manufacture of textile materials.
723. R. Walker—Working and increasing safety of railways.

Dated 26th March.

724. E. Symonds—Self-acting plug for boats, &c.
728. T. Smedley—Steam-boilers.
730. R. A. Brooman—Rag-tearing and separating machine. (A communication.)
731. G. Robb—Manufacture of sulphuric acid, &c.
732. J. Worrall, jun.—Preparing piled goods, and machinery for same.

Dated 28th March.

733. G. O. Ashbury—Manufacture of dowls in joinery.
734. J. G. T. Campbell - Ship's propeller.
735. D. S. Brown—Engines to be worked by steam or other elastic fluids, and for generating same.
736. A. C. Bernard and J. M. P. A. de St. Roman—Improved mode of giving publicity.
737. T. J. Perry—Improvements in printing.
738. J. Scott, jun., and G. W. Jaffrey—Steam-engines.
739. S. Fox—Umbrella and parasol frames.
741. G. E. Dering—Manufacture of certain salts and oxides of metals.

Dated 29th March.

742. S. Bayliss—Construction of ships.
743. S. Bayliss—Repeating fire-arms.
744. L. Smith—Machinery for weaving and printing.
745. T. Hill—Springs for railway and other carriages.
746. S. Newton—Self-acting friction-break for railway carriages.
748. R. Heath—Railway breaks and signals.
749. J. Rider—Cocks for drawing off liquids.
750. L. F. Keogh—Looms.
751. J. Gray—Application of heat for baking.
752. W. Henham—Plough.
755. J. Pym—Permanent way.
756. G. Shaw—Knives and forks.
757. J. Bernard—Boots, shoes, and clogs, and machinery for same.
758. J. Haddan—Railway carriages.

Dated 30th March.

759. M. Billing—Method of constructing walls of houses, &c.
760. W. Henham—Regulating draft of chimneys, &c.
762. J. Bowron—Manufacture of crown, sheet, plate, and bottle glass.
763. C. Nickels—Weaving narrow fabrics.
764. R. Dalgleish—Improvement in dyeing.
765. J. C. Ramsden—Looms.
766. J. X. Villiet, aîné—Production of ærated liquids.
767. J. Houston—Weaving.
768. J. Worrall, jun.—Method of preparing, &c., cords, velveteens, &c.
769. L. Faulkner—Motive power.

Dated 31st March.

770. W. A. P. Aymard—Application of bituminous products of coal, &c., for lighting, and rectification of essences and other matters from coal.
772. R. M'Gavin—Construction of ships' masts, yards, booms, and spars.
774. J. Radcliffe—Looms.

WEEKLY LIST OF PATENTS SEALED.

Sealed 9th March, 1853.

313. John Egan, of William-street, Limerick—Invention of a self-acting flax scutching and hackling machine with horizontal blades or hackles, an inclined plane on which flax-holders move, the application of the fan by a current of air, to press flax against scutching-blades or hackles, and spring-catch flax-holders.
344. Samuel Perkes, of 1, Walbrook, City—Improvements in certain apparatuses and machines for the production and treatment of mineral and other substances, and part of which are applicable for other useful purposes.

346. Samuel Perkes, of 1, Walbrook, City—Improvements in mines, buildings, and sewerage, for effecting sanitary purposes, and treating the produce therefrom.
397. Henry Moseley, of Wandsworth—Invention of a machine to be driven by the pressure of a fluid, or to displace a fluid, or to measure it.
406. Andrew Blair, of Mary-hill, Lanark—Improvements in printing or ornamenting fabrics.
431. Henry Hughes and George Firmin, of Plough-road, Rotherhithe—Improvements in the manufacture of lamp-black, and in recovering from such manufacture a substance suitable for fuel.
437. Arthur James, of Redditch—Improvements in needle-cases or wrappers.
477. Henry Charles Gover, of 9, Princes-street, Bedford-row—Improvements in the apparatus used in printing with colours.
499. James Brodie, of the Bow of Fife, Fifeshire—Improvements in the construction of sea-going vessels.
541. Thomas Wilks Lord, of Leeds—Improvements in safety and other lamps.
567. Richard Archibald Brooman, of 166, Fleet-street—Improvements in violins and other similar stringed musical instruments.
572. Henry Brinsmead, of St. Giles-in-the-Wood, Devonshire—Invention for shaking straw, to be attached to thrashing-machines.
626. Charles Phillips, of Bristol—Improvements in apparatus or machinery for reaping or cutting crops of corn, or other crops to the cutting of which reaping-machines are applicable.
640. Marc Klotz, of 77, Rue Rambuteau, Paris—Invention of an improved process and apparatus to be employed in ornamenting fabrics, leather, paper, and other surfaces.
876. Jean Hyppolite Silvanaine, of Paris—Improvements in the manufacture of paletots and other articles of dress, the said improvements being obtained by an improved process of felting and fulling.
910. Jules Barse and Paul Gage, of Paris, and 16, Castle-street, Holborn—Improvements in apparatus for manufacturing soda-water and other ærated liquids, and likewise in the preparation of the substances employed therein.
1030. Stephen Green, of Princes-street, Lambeth—Improvements in joining earthenware tubes and pipes.
1167. John Anderson, of Rugby—Invention for heating and ventilating apartments, and for remedying smoky chimneys, by a radiant ventilating grate.
27. Frederick Arnold, of Devonport—Improvements in heating the water in a bath or other vessels.
106. Hippolite Charles Vion, of Paris, and 16, Castle-street, Holborn—Improvements in apparatus for refrigerating.
162. Benjamin Quinton, of Birmingham—Invention of a new or improved fastening for brooches and other articles of jewellery and dress.
171. Henry Brinsmead, of St. Giles-in-the-Wood, Devonshire—Invention for reaping all kinds of corn.
179. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in aërial navigation, and in the machinery or apparatus connected therewith. (A communication.)
285. John Verinder Kiddle, of 4, Elder-street, Norton Folgate—Improvements in cocks or taps.
309. John Dudgeon, of St. Michael's-chambers, 42, Cornhill—Improvements in machinery used for raising propellers.
310. Jacob Vale Asbury, of Enfield—Improvements in railway carriages.
326. Alexander Parkes, of Burry Port, Carmarthen—Improvements in the separation of certain metals from their ores or other compounds.
346. John Seaward, of Canal Iron-works, Poplar—Improvements in marine engines.
401. Job Cutler, of Birmingham—Improvements in the manufacture of spoons and forks, and other similar articles for domestic use.
431. Frank Clarke Hills, of Deptford, and George Hills, of Lee, Kent—Improvements in refining sugar, and in preparing materials applicable to that purpose.
433. Charles Cowper, of 22, Southampton-buildings—Improvements in the manufacture of oxide of zinc or zinc white, and in apparatus for that purpose. (A communication.)
434. Charles Nightingale, of Wardour-street, Soho—Improvements in drying and heating certain substances or articles.

Sealed 13th April.

366. Joseph Nash, of 3, Thames-parade, Pimlico—Invention of the treatment and refining of sugar.
374. Christopher Hill, of Swindon—Improvements in the manufacture of lubricating matter.
375. Gerard Andrew Arney, of Mitcham—Improvements in coating or enamelling pictures, prints, paper, and other surfaces.
379. John Henry Lee, of 31, Northampton-square—Improvements in sawing.
396. James Lochhead, of Kennington, and Robert Passenger, of Union-street, Southwark—Improvements in the manufacture of glass and other vitrified substances, and in ornamenting and annealing the same.
417. Pierre Augustin Pius, of Paris, and 4, South-street, Finsbury—Invention of an improved chain or cable, and an apparatus employed therewith, for certain applications.
424. John Henry Johnson, of 47, Lincoln's-inn Fields, and Glasgow—Improvements in drying, and in the machinery or apparatus to be used therein.
443. William Chisholm, of Holloway—Improvements in obtaining caustic, soda, and other substances, from the residues of articles used in the purification of gas.
484. George Ellins, of Droitwich—Invention of an improved method and apparatus for dressing and cleaning flax straw.
526. James Nasmyth, of Stafford-street, Bond-street—Invention of an improved mode of utilizing running waters.
527. Joseph Charles Frederick, Baron de Kleinsorgen, of New-street—Invention of an improved apparatus for indicating the variation of the magnetic needle.
537. William Robert Bertolacci, of 45, Rue d'Amsterdam, Paris—Invention of an improved pneumatic ink and pen-holder.
546. James Nasmyth, of Stafford-street, Bond-street—Improvements in the mode of obtaining and applying motive power.
634. Emily Petit, of 10, Brompton-terrace, Brompton—Invention of a musical instrument, which she calls an "Euphatine."
649. Andrew Lawson Knox, of Glasgow—Improvements in the manufacture or production of ornamental fabrics.
784. Robert Walker, of Glasgow—Improvements in the construction of portable houses and other erections.
936. John Norton, of Cork—Improvements in shot or projectiles.
1209. Thomas Benjamin Smith, of Bristol—Improvements in calcining certain ores, and in the construction of furnaces for that purpose, and for converting certain products arising in the process into an article of commerce not heretofore produced therefrom.
13. Lazare François Vaudelin, of Upper Charlotte-street, Fitzroy-square—Improvements in apparatus for retarding and stopping railway carriages.
102. Frederick Joseph Bramwell, of Millwall, and Isham Baggs, of Liverpool-street—Improvements in steam machinery used for driving piles, hammering, stamping, and crushing.
255. Edmund Leach, of Rochdale—Improvements in the mode or method of preparing and spinning cotton, wool, flax, and other fibrous substances, and in the machinery or apparatus employed therein.
324. John Campbell, of Bowfield, Renfrew—Improvements in the treatment or finishing of textile fabrics and materials.
327. Edward Palmer, of Woodford-green, Essex—Improvements in carriages used on railways.
348. Charles Iles, of Peel Works, Birmingham—Improvements in pointing wire.
349. John Webster, of Ipswich—Improvements in treating animal matters, and in manufacturing manure.
360. George Hutchinson, of Glasgow—Improvements in treating oils and other fatty matters.
365. Sir James Murray, of Dublin—Improvements in deodorising cod-liver oil, in rendering it more agreeable and easier to use either by itself or mixed, and so as to be capable of being administered in larger quantities, and with greater success.
396. William Blissett Whitton and George Samuel Whitton, of 18, Princes-street, Lambeth—Improvements in the manufacture of sewer and other pipes.
403. George Gray Mackay, of Grangemouth, near Falkirk—Improvements in the construction of drain pipes.
407. John George Perry, of 12, Westbourne-street, Hyde-park-gardens—Improvements in bookbinding, to facilitate the finding of places in books.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
April 7	3443	Despatch-box or Writing-case	John Fryer	63, Charing-cross.
,, ,,	3444	Improved Collar for connecting Pipes	J. C. Gunn	6, Picardy-place, Edinburgh.
,, 13	3445	Shirt-front	John Paterson	Wood-street, Cheapside.